Chapter 2 Linear Relations and Functions

2-1 Relations and Functions

Relation--set of ordered pairs

{(2, 5) (3, 6) (4, 7)}

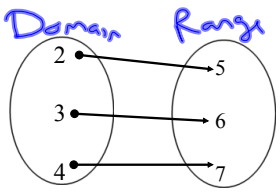
Domain--set of 1st coordinate

{2, 3, 4}

Range--set of 2nd coordinate

{5, 6, 7}

Function--relation in which each element in the domain is paired with exactly one element in the range



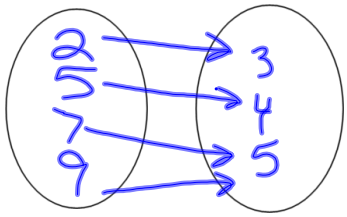

Mapping

A function because every x is paired with exactly one y.

One-to-one--when every element in the range is paired with exactly one element in domain

(Every y has one x)

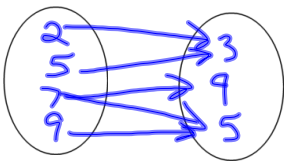
{(2, 3), (5, 4), (7, 5), (9, 5)}




Function? yes

1-1? no

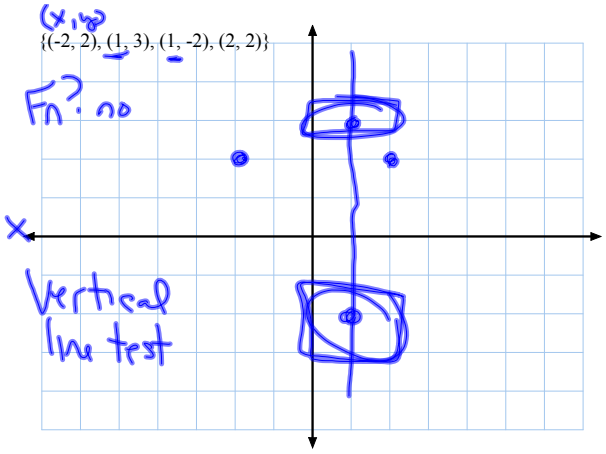
{(2,3), (5, 3), (7, 4), (7, 5), (9, 5)}




Fn? no

(x, y)

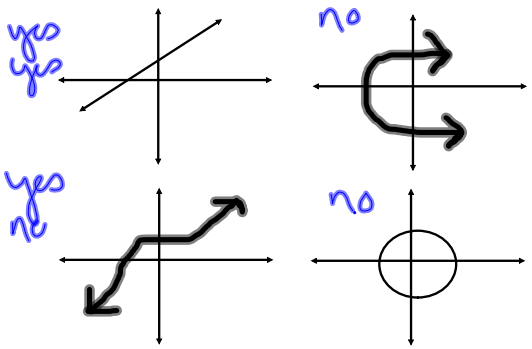
{(-2, 2), (1, 3), (1, -2), (2, 2)}

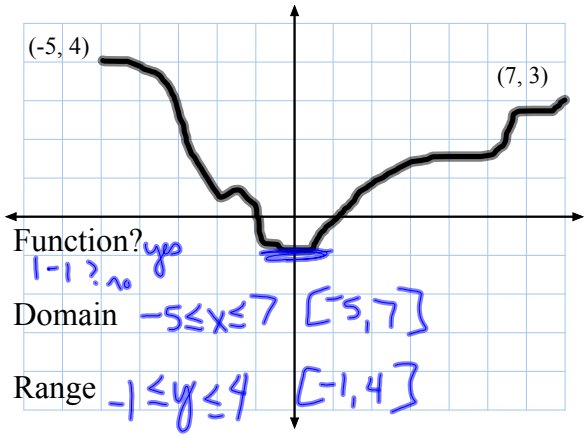


Fn? no

Vertical line test

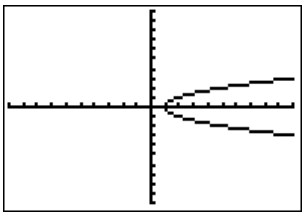
Is it a function?




Function? yes
1-1 ? no
Domain $-5 \le x \le 7$ $[-5, 7]$
Range $-1 \le y \le 4$ $[-1, 4]$

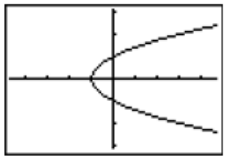
$x = y^2 + 1$



Function? no
Domain $[1, +\infty)$ $x \ge 1$
Range $\mathbb{R}$ $(-\infty, \infty)$

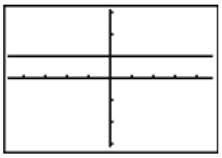
Worksheet

1.



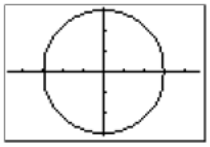
a. no
b. —
c. D: $[-1, +\infty)$ $x \ge -1$
d. R: $\mathbb{R}$

2.



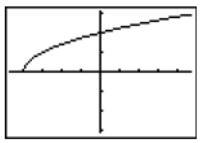
a. yes
b. no
c. D: $\mathbb{R}$
d. R: $y = 1$

3.



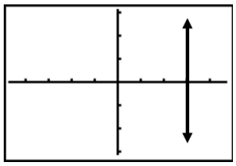
a. no
b. —
c. D: $[-3, 3]$
d. R: $[-3, 3]$

4.



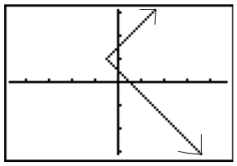
a. yes
b. yes
D: $[-4, +\infty)$
R: $[0, +\infty)$

5.



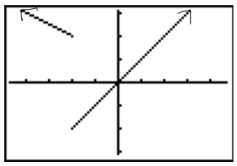
a. no
c. D: $x = 3$
R: $\mathbb{R}$

6.

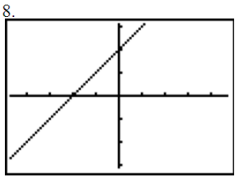


a. no
D: $[-\frac{1}{2}, +\infty)$
R: $\mathbb{R}$

7.



8.

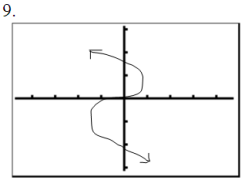


a. no

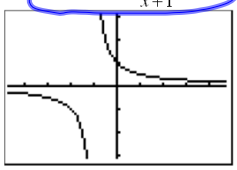
c. D: $\mathbb{R}$

R: $[-2, +\infty)$

9.



10. $y = \frac{1}{x+1}$



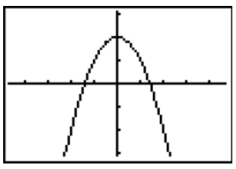
a. yes

b. yes

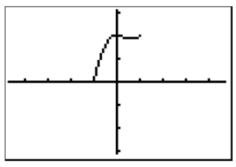
D: $\mathbb{R}$, $x \neq -1$

R: $\mathbb{R}$, $y \neq 0$

11.



12.



a: yes

b: No

D: $[-1, 1]$

R: $[0, 2]$

## Function Notation

$f(x) = 3x + 2$ $g(x) = x^2 - 2x$

$f(4) = 3(4) + 2$

$f(4) = 14$

$g(-5) = (-5)^2 - 2(-5) = 35$

HW

p60-61

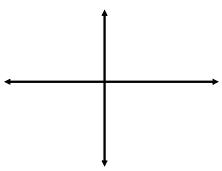
#s 4-6, 17-22, 23-33odd, 42-53

Graph these:

$f(x) = |x + 2|$

Domain

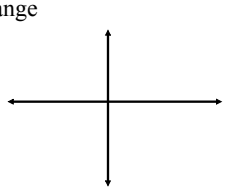
Range



$f(x) = \frac{1}{x-2}$

Domain

Range



Fuel Efficiency for light trucks

| | |
|---|---|
| 1995 | 20.5 |
| 1996 | 20.8 |
| 1997 | 20.6 |
| 1998 | 20.9 |
| 1999 | 20.5 |
| 2000 | 20.5 |

Function?

1-1?